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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/674,583	02/05/2001	Hongchang Bao	450108-02391	1517

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EXAMINER	
BRANT, DMITRY	

ART UNIT	PAPER NUMBER
2655	5

DATE MAILED: 04/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/674,583	BAO, HONGCHANG	
	Examiner	Art Unit	
	Dmitry Brant	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03/03/2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 - 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang (6,188,982) in view of Erell et al. (5, 778,342)

The U.S. patents of Chiang and Erell et al. teach computer-based apparatuses (systems) and hence the methods and computer code necessary to implement these systems are inherently part of Chiang's and Errell et al.'s references.

The examiner interprets all claims reciting, "state that said data do not exists" as references to a state of silence/noise, when speech is not present in the signal.

As per claims 1, 6 and 7, Chiang discloses:

- extracting means for extracting feature vectors (distributions) from input speech (elem. 11, FIG. 3). The speech recognizer will necessarily convert input speech to feature vectors.

- Storing means for classification models (Hidden Markov Models) (HMMs, elem. 18, FIG. 3)
- Classifier circuit (elem. 22, FIG. 3) for the extracted feature vectors. (Abstract)
- Parallel Model Combination (PMC) circuit (elem. 16, FIG. 3) for generating and storing adapted HMMs (elem. 14, FIG. 14) based on the noise extracted from the immediately collected input data (Col. 4, lines 5-7)

Chiang does not disclose extracting noise from input just preceding the input of speech data.

Erell et al. teaches extracting background noise speech vector right before speech utterance is spoken. (Col. 6, lines 9-12)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Chiang as taught by Errel. et al. in order to get the clean estimation of the background noise signal because at that time right before utterance is spoken only the noise signal is present in the input data and the resulting noise estimation is much more reliable.

As per claims 2 and 3, the examiner has interpreted them as reciting that silence (noise) is a normal (Gaussian) process, and that the estimate of the average of the frame features has a mean (claim 2 and 3) and variance (claim 2) obtained, respectively, by summing the frame feature means, and by summing their respective variances (the latter being the sum of squared frame mean estimates minus the sum of

the squared of the means, statistical independence of the features and time-invariant frame statistical properties having been assumed). Gaussian (normal) noise distributions were assumed by Chiang in his PMC model (Col. 4, lines 48-51), and the above mean and variance relationship inherently follow (see the sample MLE tutorial reference, Eq. 26 and 27 - reviewing standard statistical results, wherein Ti is interpreted as the frame feature mean), since the summed frame noise mean estimates are independent random variables.

As per claim 4, Chiang discloses the use of linear interpolation for re-estimation of noise model (Eq. 6 and Col. 4, lines 54-64).

As per claim 5, Chiang discloses the use of PMC which performs the "sum of statistical populations" of noise and clean speech portions of the overall signal because of the independent properties of speech and noise signals (FIG. 2).

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gong (6,418,411) teaches noise estimation for adaptive speech recognition

Gong et al. (6,381,571) teaches determination of log-spectral mean using MAP estimation.

Oh et al. (5,353,376) teaches a method and system for speech acquisition/recognition in noisy environment.

Takagi et al. (5,651,094) discloses mean value calculating apparatus for speech recognition

Smyth (6,230,128) teaches a method of speech recognition in noisy environments.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dmitry Brant whose telephone number is (703) 305-8954. The examiner can normally be reached on Mon. - Fri. (8:30am - 5pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Talivaldis Ivars Smits can be reached on (703) 306-3011. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to Tech Center 2600 receptionist whose telephone number is (703) 305- 4700.

DB

3/24/04

TALIVALDIS IVARS SMITS
PRIMARY EXAMINER